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MANUFACTURING SYSTEMS INTEGRATION

Long Term Knowledge Retention (LTKR): Archival and Representation Standards
March 15-16 2006
National Institute of Standards and Technology
Gaithersburg, MD 20899

Goal:

To identify challenges, research, and implementation issues in digital preservation of information with an emphasis on design and manufacturing.

Problem Statement:

In this age of Internet and networked economy, the rate at which the digital information generated is far exceeding the rate of consumption. According to some reports, today it takes about 15 minutes for the world to churn out new digital information equivalent to the entire collection in US Library of Congress. It does so about 100 times every day, for a grand total of five exabytes annually. This phenomenal proliferation of information clearly underscores the ease with which we can produce digital data. But our capacity to make all these digital information accessible in 200 or even 20 years remains a work in progress.

Recognizing the importance of these electronic records for its mission of preserving "essential evidence," the National Archives and Records Administration (NARA) launched a major new initiative, the Electronic Records Archives (ERA) initiative, in 1998. The Consultative Committee for Space Data Systems (CCSDS) recommendation established a common framework of terms and concepts which comprise an Open Archival Information System (OAIS) which was later adapted as ISO 14721:2003. Various other efforts are being explored to address the needs for long term knowledge retention in specific areas like manufacturing, health care and life sciences, legal, and military applications.

In all these efforts, standards play a very crucial role. In the area of engineering informatics, the LOTAR (LOng Term Archiving and Retrieval of digital technical product documentation, such as 3D-CAD and PDM data) project studied the applicability of the international standards such as ISO 14721:2003 and ISO 10303 (STEP). The importance of digital preservation is clearly emphasized by various efforts as mentioned above and more specifically by the Digital Preservation Project of US Library of Congress (www.digitalpreservation.gov). But the long term retention of digital information is a work in progress and there are various issues that need to be addressed. In this

workshop we intend to provide a forum for information and archival specialists, domain knowledge experts from manufacturing and product engineering, and other stakeholders, to discuss, among other things, the following set of issues:

1. **Digital Archiving Models, Representation Languages and Standards**
   - What constitutes a canonical representation for archiving?
   - How to compress data and develop data reduction schemes?
   - How to manage interoperability among different archival systems?
   - How to convert submission information to archived information and how to create disseminated information taking a holistic view of information package? This is essential to avoid fragmentation of creation, storage, and retrieval.
   - Authentication and trustworthiness of archived information?
   - What is the role of standards in information packages? How to develop standard schemas for submission information package, archival information package, dissemination information package, and Producer-Archive Interface Methodology Standard?
   - Domain Taxonomies, Thesauri and Ontologies
   - Role of markup languages and achieving Semantics Interoperability
2. **Challenges and Issues in Manufacturing Engineering Informatics**
   - What is to be archived beyond geometry information? How is this information to be represented?
   - Is STEP a starting point for content information?
   - How to scale from part level to system level information?
   - How to incorporate tolerance information?
   - What is the initial requirement (draft) for Preservation Description Information (PDI) for product data?
   - What are the Access points (for retrieval) for product data? Is there a role for generic features and contextual indexing?

Expected outcome:

A detailed roadmap identifying areas of investigation and experimental testbeds for archival of design and manufacturing information.

Organizing committee:

Co-Chairs
Joshua Lubell NIST
Sudarsan Rachuri, NIST and George Washington University
William Regli, Drexel University

Committee members
Robert Chadduck, National Archives Records Administration
Eswaran Subrahmanian, Carnegie Mellon University and NIST
John Zimmerman, Dept. of Energy, National Nuclear Security Administration

Agenda

Panel 1: Challenges and Issues in Manufacturing Engineering Informatics
Panel 2: Digital Archiving Models, Representation Languages and Standards

March 15 2006	
Time	**Description**
8:30-9:00 AM	**Refreshments and Registration**
9:00-9:15	**Welcome and Introduction**
9:15-10:00	***Call to Action*, Dr. Robert Chadduck, National Archives**
10:00-10:15	**Coffee Break**
10:15-12:15	**Panel 1** **Doug Cheney (ITI Transcendata) – *AMBER Geometry Analysis*** **Crispin Hales (Hales-Gooch) – *Archiving Engineering Case Files for Future Reference*** **Jim Mays (Navy) – *Defense Archiving Issues and Initiatives*** **Frank Brown (Kansas Univ.) – *Design Geometry Inferencing***
12:15-01:15	**Lunch**
1:15-3:15	**Panel 2** **Don Sawyer (NASA) – *The Open Archival Information System (OAIS) Standard*** **Lou Reich (CSC) – *Metadata Standards for Archives*** **Burt Gischner (Electric Boat) – *The Role of ISO 10303 (STEP) in LTKR*** **Caroline Arms (Library of Congress) – *Sustainability of Digital Formats***
3:15-3:30	**Coffee Break**
3:30-5:30	**Parallel Break out sessions (2 -3 groups)**

March 16 2006	
Time	**Description**
8:30-9:00 AM	**Refreshments**
9:00-9:45	***Principles for Digital Preservation*, Henry M. Gladney, HMG Consulting**
9:45-10:00	**Coffee Break**
10:00-12:00	**Report from the break out sessions** **Will be divided among the groups**
12:00-12:15	**Concluding Remarks**